INTELLIGENT INFORMATION PROCESSING II
IFIP – The International Federation for Information Processing

IFIP was founded in 1960 under the auspices of UNESCO, following the First World Computer Congress held in Paris the previous year. An umbrella organization for societies working in information processing, IFIP’s aim is two-fold: to support information processing within its member countries and to encourage technology transfer to developing nations. As its mission statement clearly states,

"IFIP's mission is to be the leading, truly international, apolitical organization which encourages and assists in the development, exploitation and application of information technology for the benefit of all people."

IFIP is a non-profitmaking organization, run almost solely by 2500 volunteers. It operates through a number of technical committees, which organize events and publications. IFIP’s events range from an international congress to local seminars, but the most important are:

- The IFIP World Computer Congress, held every second year;
- Open conferences;
- Working conferences.

The flagship event is the IFIP World Computer Congress, at which both invited and contributed papers are presented. Contributed papers are rigorously refereed and the rejection rate is high.

As with the Congress, participation in the open conferences is open to all and papers may be invited or submitted. Again, submitted papers are stringently refereed.

The working conferences are structured differently. They are usually run by a working group and attendance is small and by invitation only. Their purpose is to create an atmosphere conducive to innovation and development. Refereeing is less rigorous and papers are subjected to extensive group discussion.

Publications arising from IFIP events vary. The papers presented at the IFIP World Computer Congress and at open conferences are published as conference proceedings, while the results of the working conferences are often published as collections of selected and edited papers.

Any national society whose primary activity is in information may apply to become a full member of IFIP, although full membership is restricted to one society per country. Full members are entitled to vote at the annual General Assembly. National societies preferring a less committed involvement may apply for associate or corresponding membership. Associate members enjoy the same benefits as full members, but without voting rights. Corresponding members are not represented in IFIP bodies. Affiliated membership is open to non-national societies, and individual and honorary membership schemes are also offered.
Contents

Welcome Address xi
Greetings from Chairs’ of Program Committee xiii
The Organizations of the Conference xv
Refereers List xvii
Keynote Speech xix
Invited Speech xx

1  MODEL ORGANIZATION CONSTRAINTS IN MULTI-AGENT SYSTEM
   Xinjun Mao and Jiajia Chen 1
2  A MULTI-AGENT SYSTEM FOR MOBILE ENVIRONMENTS
   Jianwen Chen and Yan Zhang 11
3  AGENT INTERACTION MANAGEMENT AND APPLICATION
   IN A VIRTUAL COLLABORATIVE ENVIRONMENT
   Aizhong Lin, Igor T. Hawryszkiewycz, Brian Henderson-Sellers 23
4  AN INTEGRATED APPROACH TO BATTLEFIELD SITUATION ASSESSMENT
   Yang Fan, Chang Guocen, Duan Tao and Hua Wenjian 37
5 NEGOTIATION BASED ON PERSONALITY
Hong Zhang and Yuhui Qiu 45

6 MIAM: A ROBOT ORIENTED MOBILE INTELLIGENT AGENT MODEL
Wu Shandong and Chen Yimin 51

7 INCORPORATING ELEMENTS FROM CAMLE IN THE OPEN REPOSITORY
C. Gonzalez-Perez, B. Henderson-Sellers, J. Debenham
G.C. Low and Q.-N.N. Tran 55

8 REPRESENTING HUMAN SPATIAL BEHAVIOR BY SELF-ORGANIZING NETWORKS
Takamitsu Mizutori and Kenji Kohiyama 65

9 MULTI-AGENT SYSTEM DEVELOPMENT KIT- MAS SOFTWARE TOOL IMPLEMENTING GAIA METHODOLOGY
Vladimir Gorodetski, Oleg Karsaev, Vladimir Samoilov, Victor Konushy, Evgeny Mankov and Alexey Malyshev 69

10 LIMITATIONS IN AUML'S ROLES SPECIFICATION Jean-Luc Koning & Ivan Romero Hernández 79

11 THE RESEARCH OF GEOMETRIC CONSTRAINT SOLVING BASED ON THE PATH TRACKING HOMOTOPY ITERATION METHOD
Cao Chunhong, Lu Yinan and Li Wenhui 83

12 FAST STEREO MATCHING METHOD USING EDGE TRACTION
Zheng-dong Liu, Ying-nan Zhao and Jing-yu Yang 93

13 HYBRID COLOR IMAGE SEGMENTATION BASED FULLY AUTOMATIC CHROMAKEYING SYSTEM WITH CLUTTERED BACKGROUND
Li Shijin, Zhu Yuelong, Yang Qian and Liu Zhe 97

14 RESEARCH ON TECHNIQUES OF APPROXIMATE RECOGNITION OF CONTINUOUS DEFORMATION OF IMAGES WITH MULTI-GREY-LEVELS
Feng Zhi-quan, Li Yi and Qu Shou-ning 107

15 RECOGNITION OF IMAGE WITH NATURAL TEXTURES BASED ON LEARNING OF INFORMATION AUGMENTATION
Cheng Xian-Yi1,Yuan Xiao-Hua, Li Shu-Qin and Xian De-Shen 117

16 IMPROVEMENTS ON CCA MODEL WITH APPLICATION TO FACE RECOGNITION
Quan-Sen Sun, Mao-Long Yang, Pheng-Ann Heng and De-Sen Xia 125
30 DILATED CHI-SQUARE: A NOVEL INTERESTINGNESS MEASURE TO BUILD ACCURATE AND COMPACT DECISION LIST
Yu Lan, Guoqing Chen, Davy Janssens and Geert Wets 233

31 POST SEQUENTIAL PATTERNS MINING—A New Method for Discovering Structural Patterns
Jing Lu, Osei Adjei, Weiru Chen and Jun Liu 239

32 EXTENDED CONSTRAINT HANDLING FOR CP-NETWORKS
Yonggang Zhang and Jigui Sun 251

33 SOLVING CSP BY LAGRANGIAN METHOD WITH IMPORTANCE OF CONSTRAINTS
Takahiro Nakano and Masahiro Nagamatu 255

34 COMPONENT RETRIEVAL USING CONVERSATIONAL CASE-BASED REASONING
Mingyang Gu, Agnar Aamodt and Xin Tong 259

35 MIXED PARALLEL EXECUTION OF ALGORITHMS FOR SATISFIABILITY PROBLEM
Kairong Zhang and Masahiro Nagamatu 273

36 CLUSTERING BINARY CODES TO EXPRESS THE BIOCHEMICAL PROPERTIES OF AMINO ACIDS
Huaigu Fu, Engelbert Mephu Nguifo 279

37 NATURAL LANGUAGE INTERFACE TO MOBILE DEVICES
Lina Zhou, Mohammedammar Shaikh and Dongsong Zhang 283

38 RESEARCH AND APPLICATION IN WEB USAGE MINING OF THE INCREMENTAL MINING TECHNIQUE FOR ASSOCIATION RULE
Sulan Zhang and Zhongzhi Shi 287

39 FACE RECOGNITION TECHNIQUE BASED ON MODULAR ICA APPROACH
CAO Wen-ming, LU Fei, YUAN Yuan, WANG Shuojue 291

40 MODEL-BASED DEBUGGING WITH HIGH-LEVEL OBSERVATIONS
Wolfgang Mayer and Markus Stumptner 299

41 MAPPING SEARCH RESULTS INTO SELF-CUSTOMIZED CATEGORY HIERARCHY Saravadee Sae Tan, Gan Keng Hoon, Chan Huah Yong, Tang Enya Kong and Cheong Sook Lin 311

42 RANK AGGREGATION MODEL FOR META SEARCH --An Approach using Text and Rank Analysis Measures
Gan Keng Hoon, Saravadee Sae Tan, Chan Huah Yong and Tang Enya Kong 325
<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>43</td>
<td>ON THE IMPORTANCE OF BEING DIVERSE: ANALYSING SIMILARITY AND DIVERSITY IN WEB SEARCH</td>
<td>Maurice Coyle and Barry Smyth</td>
<td>341</td>
</tr>
<tr>
<td>44</td>
<td>USING FINITE DOMAINS IN CONSTRAINT SATISFACTION PROBLEM</td>
<td>Ilie Popescu</td>
<td>351</td>
</tr>
<tr>
<td>45</td>
<td>RESEARCH ON RADAR TARGETS RECOGNITION BY EXTRACTING 3-D CHARACTERISTIC FROM ISAR IMAGES</td>
<td>Liu, Feng and Xu, Jiadong</td>
<td>355</td>
</tr>
<tr>
<td>46</td>
<td>UNCERTAIN REASONING AND DECISION MAKING</td>
<td>Qing Zhou</td>
<td>359</td>
</tr>
<tr>
<td>47</td>
<td>DIAGNOSING JAVA PROGRAMS WITH STATIC ABSTRACTIONS OF DATA STRUCTURES</td>
<td>Rong Chen, Daniel Koeb and Franz Wotawa</td>
<td>369</td>
</tr>
<tr>
<td>48</td>
<td>INTELLIGENT TECHNOLOGY FOR WELL LOGGING ANALYSIS</td>
<td>Zhongzhi Shi, Ping Luo, Yalei Hao, Guohe Li, Markus Stumptner, Qing He and Gerald Quirchmayr</td>
<td>373</td>
</tr>
<tr>
<td>49</td>
<td>SEDATALOG: A SET EXTENSION OF DATALOG</td>
<td>Qing Zhou and Ligong Long</td>
<td>383</td>
</tr>
<tr>
<td>50</td>
<td>SESSION IDENTIFICATION BASED ON TIME INTERVAL IN WEB LOG MINING</td>
<td>Zhuang Like, Kou Zhongbao and Zhang Changshui</td>
<td>389</td>
</tr>
<tr>
<td>51</td>
<td>EFFICIENTLY MINING FREQUENT ITEMSETS WITH COMPACT FP-TREE</td>
<td>Qin Liang-Xi, Luo Ping and Shi Zhong-Zhi</td>
<td>397</td>
</tr>
<tr>
<td>52</td>
<td>TOWARDS HUMAN ORIENTED WWW</td>
<td>Alex Abramovich</td>
<td>407</td>
</tr>
<tr>
<td>53</td>
<td>AN INTELLIGENT DIAGNOSIS SYSTEM HANDLING MULTIPLE DISORDERS</td>
<td>Wenqi Shi, John A. Barnden, Martin Atzmueller and Joachim Baumeister</td>
<td>421</td>
</tr>
<tr>
<td>54</td>
<td>AN INTELLIGENT KNOWLEDGE-BASED RECOMMENDATION SYSTEM</td>
<td>Xiaowei Shi</td>
<td>431</td>
</tr>
<tr>
<td>55</td>
<td>A FORMAL CONCEPT ANALYSIS APPROACH FOR WEB USAGE MINING</td>
<td>Baoyao Zhou, Siu Cheung Hui and Kuiyu Chang</td>
<td>437</td>
</tr>
<tr>
<td>56</td>
<td>KNOWLEDGE-BASED DECISION SUPPORT IN OIL WELL DRILLING--Combining general and case-specific knowledge for problem solving</td>
<td>Pål Skalle and Agnar Aamodt</td>
<td>443</td>
</tr>
</tbody>
</table>
57 A NEW METHOD TO CONSTRUCT THE NON-DOMINATED SET IN MULTI-OBJECTIVE GENETIC ALGORITHMS
Jinhua Zheng, Zhongzhi Shi, Charles X. Ling and Yong Xie 457

58 ENSEMBLES OF MULTI-INSTANCE NEURAL NETWORKS
Min-Ling Zhang, Zhi-Hua Zhou 471

59 A WORDNET-BASED APPROACH TO FEATURE SELECTION IN TEXT CATEGORIZATION
Kai Zhang, Jian Sun and Bin Wang 475

60 A NEW SUPPORT VECTOR NEURAL NETWORK INFEERENCE SYSTEM
Ling Wang and Zhi-Chun Mu 485

61 AN IMPROVED VEHICLE CLASSIFICATION METHOD BASED ON GABOR FEATURES
Ying-nan Zhao, Zheng-dong Liu, Jing-yu Yang 495

62 AN INCREMENTAL ALGORITHM ABOUT THE AFFINITY-RULE BASED TRANSDUCTIVE LEARNING MACHINE FOR SEMI-SUPERVISED PROBLEM
Weijiang Long, Fengfeng Zhu and Wenxiu Zhang 499

63 A SHORT TUTORIAL ON REINFORCEMENT LEARNING--Review and Applications
Chengcheng Li and Larry Pyeatt 509

64 HARDWARE DESIGN OF TWO WEIGHTED NEURAL NETWORK AND APPLICATION FOR OBJECT RECOGNITION
Wenming Cao, Fei Lu, Gang Xiao, Shoujue Wang 515

65 IMPROVEMENT OF WEB DATA CLUSTERING USING WEB PAGE CONTENTS
Yue Xu and Li-Tung Weng 521

66 A PREDICTION APPROACH TO WELL LOGGING Qing He, Ping Luo, Zhong-Zhi Shi, Yalei Hao and Markus Stumptner 531

AUTHOR INDEX 541
Welcome Address

Dear Colleagues,

The International Conference on Intelligent Information Processing is opening. On behalf of the organizers, we welcome all scientists and practitioners who are interested in Intelligent Information Processing around the world participate in this event. The world is quickly stepping into the Information Age successfully on one hand, as well as problematically on the other hand. It is well recognized nowadays that Intelligent Information Processing provides the key to the Information Age. Intelligent Information Processing supports the most advanced productive tools that are said to be able to change human life and the world itself. However, experiences of recent years also clearly show that there is no way a lead straight into the Information Age. Rather, people become aware of more and more questions about Intelligent Information Processing. The conference provides a forum for engineers and scientists in academia, university and industry to present their latest research findings in all aspects of Intelligent Information Processing.

As scientists, professors, engineers, entrepreneurs, or government officials all over the world, we have the responsibility to understand the truth and explore an effective way to a better life in the Information Age. This is the motivation of IIP2004.

B. Neuman
J. Kephart
S. Doshita
Conference Chairmen of the IIP2004
Greetings from Chairs' of Program Committee

Dear colleagues and friends:

First of all, we would like to extend to you our warmest welcome and sincere greetings on behalf of the Technical Program Committee of the International Conference on Intelligent Information Processing, ICIIP04-Beijing.

This is the second International Conference on Intelligent Information Processing. We received over 270 papers, of which 66 papers are included in this program. We are grateful for the dedicated work of both the authors and the referees, and we hope these proceedings will continue to bear fruit over the years to come. Papers were submitted and reviewed by several referees.

A conference such as this cannot succeed without help from many individuals who contributed their valuable time and expertise. We want to express our sincere gratitude to the program committee members and referees, who invested many hours for reviews and deliberations. They provided detailed and constructive review reports that will significantly improve the papers included in the program.

We are very grateful to have the sponsorship of the following organizations: IFIP TC12/WG12.3, The China Computer Federation and Chinese Association of Artificial Intelligence

We hope all of you enjoy this diverse and interesting program.

Zhongzhi Shi
Institute of Computing Technology,
Chinese Academy of Sciences
The Organizations of the Conference

General Chairs
B. Neumann (Germany)  J. Kephart (USA)  S. Doshita (Japan)

Program Chairs
Z. Shi (China)  A. Aamodt (Norway)  V. Honavar (USA)

PC Committee
N. Bredeche (France)  H. Motoda (Japan)
Z. Bubnicki (Poland)  M. Musen (USA)
P. Chen (USA)  G. Osipov (Russia)
H. Chi (China)  M. Sasikumar (India)
E. Durfee (USA)  Y. Shi (USA)
B. Faltings (Switzerland)  R. Studer (Germany)
T. Finin (USA)  R. Sun (USA)
I. Futo (Hungary)  M. Stumptner (Australia)
N. Gibbins (UK)  K. Wang (Canada)
F. Giunchiglia (Italy)  B. Wah (USA)
V. Gorodetski (Russia)  S. Willmott (Spain)
J. Hendler (USA)  X. Yao (UK)
T. Ishida (Japan)  J. Yang (Korea)
D. Leake (USA)  P. Yu (USA)
J. Lee (Korea)  Eric Yu (Canada)
D. Lin (Canada)  C. Zhang (Australia)
J. Liu (Hong Kong)  N. Zhang (Hong Kong)
R. Lu (China)  Y. Zhong (China)
R. Meersman (Belgium)  Z. Zhou (China)
Referees List

N. Bredeche (France)  
Z. Bubnicki (Poland)  
P. Chen (USA)  
H. Chi (China)  
E. Durfee (USA)  
B. Faltings (Switzerland)  
T. Finin (USA)  
I. Futo (Hungary)  
N. Gibbins (UK)  
F. Giunchiglia (Italy)  
V. Gorodetski (Russia)  
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T. Ishida (Japan)  
D. Leake (USA)  
J. Lee (Korea)  
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J. Liu (Hong Kong)  
R. Lu (China)  
R. Meersman (Belgium)  
H. Motoda (Japan)  
M. Musen (USA)  
G. Osipov (Russia)  
M. Sasikumar (India)  
Y. Shi (USA)  
R. Studer (Germany)  
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S. Willmott (Spain)  
X. Yao (UK)  
J. Yang (Korea)  
P. Yu (USA)  
Eric Yu (Canada)  
C. Zhang (Australia)  
N. Zhang (Hong Kong)  
Y. Zhong (China)  
Z. Zhou (China)
Keynote Speech

Keynote Speaker: Ian Horrocks

Title: Reasoning with Expressive Description Logics: Logical Foundations for the Semantic Web

Abstract: Description Logics (DLs) are a family of logic based Knowledge Representation formalisms descended from semantic networks and KL-ONE. They are distinguished by having formal (model theoretic) semantics, and by the provision of (sound and complete) inference services, with several highly optimised implementations now being available. DLs have a wide range of applications, but are perhaps best know as ontology languages (they provide the basis for recent "Semantic Web" ontology languages such as OIL, DAML+OIL and OWL). In this talk I will give a brief history of DLs and of DL applications, in particular their application in the context of the Semantic Web. If time permits, I will then give an overview of the reasoning techniques that are employed by state of the art DL implementations, and which enable them to be effective in realistic applications, in spite of the high worst case complexity of their basic inference problems. Finally, I will point out some interesting areas for future research, in particular those related to the Semantic Web application area.

Biography: Ian Horrocks is a Professor of Computer Science at the University of Manchester. His FaCT system revolutionised the design of Description Logic systems, redefining the notion of tractability for DLs and establishing a new standard for DL implementations. He is a member of both the Joint EU/US Committee on Agent Markup Languages and the W3C
Web Ontology Language working group, and was heavily involved in the development of the OIL, DAML+OIL and OWL ontology languages. He has published widely in leading journals and conferences, winning the best paper prize at KR'98. He is/was a member of the programme/editorial committees of numerous international conferences, workshops and journals, was the program chair of the 2002 International Semantic Web Conference and the Semantic Web track chair for the 2003 World Wide Web Conference.
Invited Speaker: Toru Ishida
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Title: Mega-Navigation: Multi-Agent Navigation for Millions

Abstract: In this talk, I will propose a new digital city application, called mega navigation, that covers millions of people or vehicles with GPS. We apply multiagent technology to realize mega navigation such as wide-area traffic control, crisis management in metropolitan areas, and large-scale event navigation. We implement the mega navigation platform by combining Q and Caribbean: Q is a scenario description language for socially situated agents, and Caribbean is a mega-scale agent server. We use a new system design method called society-centered design to develop complex applications that are to be embedded into human society. In this method, we first conduct simulations consisting of a million software agents. We then perform participatory simulations, where some of the agents are replaced by real humans. We then move to the real city, and conduct augmented experiments, where real-world participants are augmented by socially situated agents.
Biography: Toru Ishida is a full professor of Kyoto University, from 1993, a research professor of NTT Communication Science Laboratories from 1998, a visiting professor of Shanghai Jiao Tong University from 2002, and IEEE fellow from 2002. I was a guest professor at Institut fuer Informatik, Technische Universitaet Muenchen in 1996, an invited professor at Le Laboratoire d'Informatique de Paris 6, Pierre et Marie Curie in 2000 and 2003, and a visiting professor at Institute for Advanced Computer Studies, University of Maryland in 2002. I have been working on autonomous agents and multiagent systems for more than twenty years. My research contribution can be classified into the three categories: production systems, multiagent search, and community computing. In production systems, I first proposed parallel rule firing, distributed rule firing and introduced organizational self-design for adapting to environmental changes. In multiagent search, I worked on realtime path finding problems and distributed constraint satisfaction problems, the two major search problems in AI. For path finding problems, I extended realtime search to be capable to utilize and improve previous experiments, and to adapt to the dynamically changing goals. In community computing, I proposed a concept of communityware to support the process of organizing diverse and amorphous groups of people, while groupware mainly addressed the collaborative work of already-organized people. My team developed mobile assistants and tried out them at international conference ICMAS96 with 100 PDAs with wireless phones. We also worked on a 3D interaction space called FreeWalk/Q, and applied it to Digital City Kyoto. I published three LNCS proceedings and created a network among digital cities. I have been working for conferences on autonomous agents and multiagent systems including MACC/JAWS (Japanese Workshop), PRIMA (Asia/Pacific Workshop), ICMAS / AAMAS (International Conference). I was a program co-chair of the second ICMAS and a general co-chair of the first AAMAS. I am an associate editor of Journal on Autonomous Agents and Multi-Agent Systems (Kluwer) and a co-editor-in-chief of Journal on Web Semantics (Elsevier).

Invited Speaker: Jung-Jin Yang
Professor Dr. Jung-Jin Yang
School of Computer Science and Information Engineering
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Bucheon-si Kyunggi-do, Seoul Korea
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Title: Semantic Search Agent System Applying Semantic Web Techniques

Abstract: Semantic analysis occurs both during the collection and classification phases and at the final stage of users search. When users submit a query, the Semantic Search Agent understands the meaning of the request according to their work context, finds relevant documents, and searches on a pre-qualified corpus. In order to infer and extract relevant information by weaving through heterogeneous databases with different schema and terminologies, the standardized way of integrating heterogeneous data is necessary. The obtained results also need be of the highest relevance for the information obtained is in effect right away. The talk describes OnSSA (Ontology-based Semantic Search Agent). It aims to develop a distributed agent-based architecture of semantic search and communication using community-specific ontologies and to equip ontologies with an inference layer grounded in W3C standards. The community-specific ontologies of OnSSA in this talk are in medicine.

Biography: Dr. Jung-Jin Yang is an assistant professor in the School of Computer Science and Information Engineering at the Catholic University of Korea. Currently, she is a head of the Division of Information System Engineering, and its research group is for Intelligent Distributed Information System – IDIS Lab. Her research group cooperates on regular basis with the company of 4HumanTech in Seoul Korea, that is a bio-informatics company. Her main research interests are in Intelligent Autonomous Agents and Multi-Agent System, Information Retrieval, Machine Learning, Ontological Engineering and User Modeling. In particular, her research is more focused in both learning and building user models to understand users better and modeling and building autonomous interface agents to provide continuous and unobstructive assists to users. As relevant research, her dissertation is directly related to the automated induction of user models bridging theory and practice. The knowledge acquisition about users is achieved through individual human-computer interactions gathered from real data in order to predict and assess user behaviors. She's been involved in a research project developing a case-based planning and execution system that is designed to work under conditions of limited computational resources and an incomplete domain theory. Later, She's participated in a project with a research team working on large scale, multi-agent, and distributed mission planning and execution employing intelligent user interfaces, hybrid reasoning and mobile agent technology with Prof. Eugene Santos Jr. at the University of
Connecticut supported by AFIT (Air Force Office for Scientific Research) 2000-2001. As recent research of hers, the study of Semantic Web applicability in bio-informatics systems and the development of the agent system within the Semantic Web was directed in order to produce and exchange useful bio-medical information by dealing with heterogeneous representations and storing schema of bio-related data. The work, which she worked as PI, was supported by Korean Science and Engineering Foundation, KISTEP 2002-2004.

Invited Speaker: Honghua Dai
Daekin University, Australia

Title: Software Warehouse and Software Mining: The Impact of Data Mining to Software Engineering

Abstract: Automating Software Engineering is the dream of software engineers for decades. To make this dream to come to true, data mining can play an important role. Our recent research has shown that to increase the productivity and to reduce the cost of software development, it is essential to have an effective and efficient mechanism to store, manage and utilize existing software resources, and thus to automate software analysis, testing, evaluation and to make use of existing software for new problems. This paper firstly provides a brief overview of traditional data mining followed by a presentation on data mining in broader sense. Secondly, it presents the idea and the technology of software warehouse as an innovative approach in managing software resources using the idea of data warehouse where software assets are systematically accumulated, deposited, retrieved, packaged, managed and utilized driven by data mining and OLAP technologies. Thirdly, we presented the concepts and technology and their applications of data mining and data matrix including software warehouse to software engineering. The perspectives of the role of software warehouse and software mining in modern software development are addressed. We expect that the results will lead to a streamlined high efficient software development process and enhance the productivity in response to modern challenges of the design and development of software applications.

Biography: Dr Honghua Dai joined the School of Information Technology at Deakin University in Australia at the start of 1999. Prior to that Honghua was on the faculty of the University of New England. Before that, he was a
Invited Speaker: Jean-Luc Koning
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Title : Protocol Operational Semantics for Multiagent Systems

Abstract: In this invited talk, I will present a system for representing interaction protocols called POS which is both Turing complete and determine a complete semantics of protocols. This work is inspired by the Structured Operational Semantics in programming languages. I will precisely define POS and illustrate its power on extended examples. POS is a general agent conversation protocol engineering formalism that has proved efficient for the design of communities of software information agents. I will also show that POS is also valuable for robotic agents which have to
operate in real time, like in the case of robot-soccer. It shows how an inherently symbolic abstract system like POS can be neatly integrated with agents whose internal architecture is reactive and relies on bottom-up behavior-based techniques.


Responsibilities
_ Leader of a sino-french advanced research project with the Chinese Academy of Sciences
_ Participant in the GEOMED research project sponsored by the European community.
_ Co-leader in a French national research project on Telecommunication.
_ Consultant for industrial projects in applied Computer Science.
_ Participant in the DARPA and AFOSR research project F49620-90-C-0003.

Invited Speaker: Markus Stumptner

Title: Model-Based Diagnosis and Debugging

Abstract: Model-based Reasoning was originally based on the realization that the description of physical devices and systems in declarative fashion can dramatically facilitate the flexibility of knowledge base construction when reasoning about the systems' behavior and function. Traditionally the main application for this has been in Model-Based Diagnosis where generic reasoning algorithms are applied to models (i.e., formal declarative descriptions) of basic components from a particular domain to identify and rank faults in complex systems composed from these components, in the presence of incomplete information and multiple simultaneous faults. Extensions of the paradigm have covered testing, repair and reconfiguration,
and for several years also the application of model-based diagnosis to software artifacts. This area, model-based debugging, poses challenges both in the different kinds of models required and in the difficulties posed by finding diagnoses in a design environment. The talk will present the genesis of Model-Based Debugging from its diagnosis origins and the state of the art in MBD methods.

Biography: Markus Stumptner obtained his Ph.D. at the Databases and AI Group of Vienna University of Technology in 1990. He originally worked in Database Theory, Transaction Management, and Data Modeling and later led a series of projects in Model-Based Reasoning with industrial applications in intelligent product configuration, and model-based diagnosis of VLSI designs. His current main research areas are model-based debugging and the use of behavior descriptions for software and database integration.